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WILDLIFE FOR TOMORROW

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WILDLIFE

Conservation is a state of harmony between men and land. By land is meant all of the things on, over, or in the earth. . . . The problem, then, is how to bring about a striving for harmony with land among a people, many of whom have forgotten there is any such thing as land. . . . This is the problem of "conservation education."
—Aldo Leopold (1887-1948)

EASTERN TIMBER WOLF
COURTESY DR. L. DAVID MECH

FRONT COVER: ROCKY MOUNTAIN BIGHORN SHEEP

FOR TOMORROW

Office of Information
Forest Service—U.S. Department of Agriculture

Program Aid No. 989
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

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PREFACE

Critics have said that we Americans have despoiled our land, wasted our natural resources, polluted our water and air, leveled our forests, and decimated our wildlife. It is true that mistakes have been made and that many of our problems have not been resolved, but . . .

Is it a poor defense to point out that these United States have evolved from a primitive wilderness to a civilization boasting of the greatest society in history—all in the space of less than 200 years?

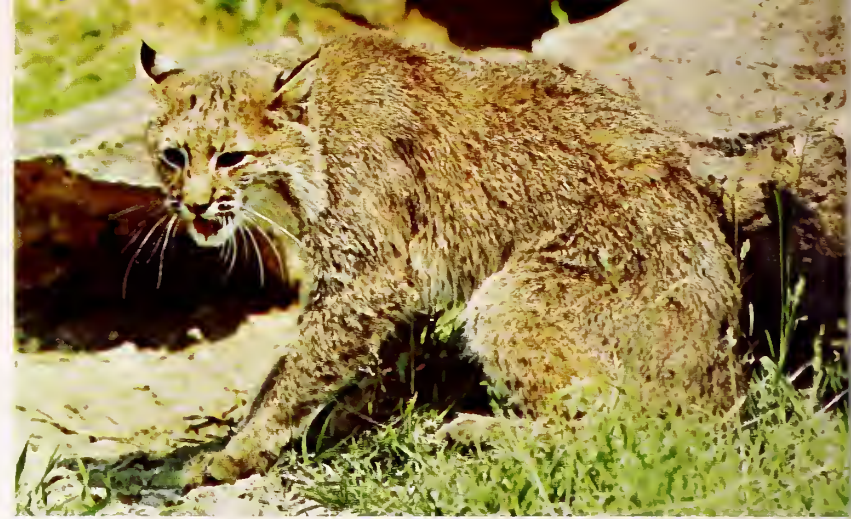
Is it a poor defense to point out that this Nation has reserved for public use 760 million acres of land within the National Forests and Grassland, National Parks, fish and game refuges and ranges, and other public lands and reservations . . . and that more than 14 million acres of Wilderness and Primitive Areas have been established on our National Forests “. . . where the earth and its community of life are untrammelled by man?”

Is it also a poor defense to point out that as a Nation we are recognizing our mistakes and inadequacies and are taking steps to correct them?

As is so often the case, one must search for perspective and make evaluations in context of the times.

We will be judged by our offspring and in that judgment if all they can contemplate is muddy and polluted rivers, eroded hillsides, burned forest lands, and wildlife behind glass, stuffed, then they will have a right to ponder just what type of improvident barbarians sired them.

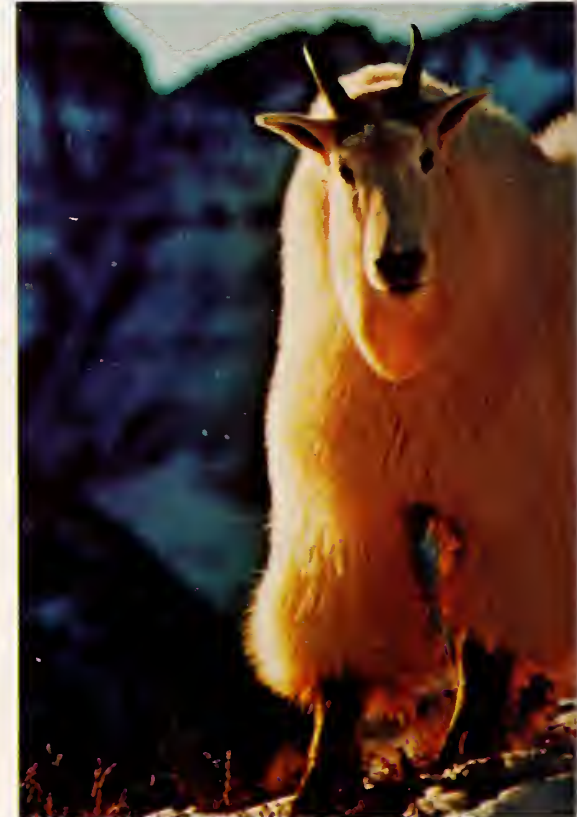
—Ernest F. Swift (1897-1968)



BOBCAT



PRONGHORN ANTELOPE



ROCKY MOUNTAIN GOAT

INTRODUCTION

The late Aldo Leopold—one of the foresighted conservation leaders who pioneered the Wilderness concept of National Forest land—made a significant comment several years before his death: “Ecology is an infant just learning to talk, and like other infants, is engrossed with its own coinage of big words. Its working days lie in the future.”

There is a desperate need for modern man to understand the basic organization of nature—the ecological system of which he is a part—even though ecosystems today are tremendously more complicated than those of his forebears. The fact that most men’s lives are several steps removed from direct contact with nature does not alleviate the effects of their actions and political decisions.

To be able to understand ecology, one must first understand the concept of “ecosystem.” An ecosystem is the sum total of all the living and nonliving things that support the life chain within a given area. The four primary links in this life chain are—

NONLIVING MATTER: sunlight, water, oxygen, carbon dioxide, organic compounds, and other nutrients used by plants for growth.

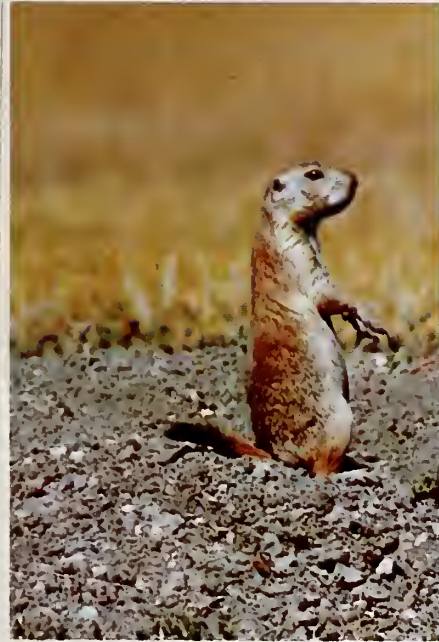
THE PLANTS: ranging in size from the microscopic phytoplankton in water up through grass and shrubs to trees. These organisms in the ecosystem are the producers.

THE CONSUMERS: higher organisms that feed on the producers. Herbivores, such as the rabbit and deer consume the plants. Carnivorous man and such animals as the wolf and panther, and raptor birds such as the eagle and hawk, feed upon the herbivores and are secondary consumers.

THE DECOMPOSERS: these tiny creatures—bacteria and fungi—close the cycle of ecosystem when they break down the dead producers and consumers and return their chemical compounds to the ecosystem for reuse by the plants.

It is difficult, if not impossible, to stockpile wildlife. One of the most difficult biological facts to explain to the general public is that regulated hunting and fishing pressures generally have minimal effect upon the total population of wildlife and fish species.

BLACK-TAILED PRAIRIE DOG



BLACK-FOOTED FERRET
COURTESY SOUTH DAKOTA DEPT. GAME, FISH, AND PARKS



WHITE-TAILED DEER FAWN



The quantity and quality of the habitat is the real key to population levels of most species. This should not be construed to mean that illegal hunting and, in some situations, overhunting and overfishing do not play a role in controlling population numbers.

Many people do not realize that deer populations can temporarily increase beyond the sustained capability of the habitat to support them. Where this situation exists, the capacity of the range to support deer is decreased and can result in a winter kill of thousands of deer that might otherwise have been harvested by sportsmen. The changing patterns of land use, which are resulting in fewer and fewer acres of quality wildlife habitat, are more responsible for declining wildlife populations than regulated hunting. Recent studies have shown that declines in population for species such as the raptors are at least partially the result of pesticides.

However, many species of wildlife in the National Forests and National Grasslands of the United States have increased dramatically in the last four decades. In recent years, the estimated number of big-game animals on the 187 million acres of National Forests and Grasslands has gradually declined to about 4.0 million, compared with 900,000 animals in 1928.

A large segment of the land on which big-game animals live in the United States is administered by either the States or Federal agencies.

While there has been substantial growth in the number of many of these species, special survival management plans are in effect on the Federal and State lands to improve the plight of many endangered wildlife species. Some of the better known species are the Florida panther, California condor, Kirtland's warbler, and the Piute cutthroat trout.

The Forest Service is proud of its stewardship of National Forests and National Grasslands and is dedicated to modern techniques of management directed toward preservation of this valuable natural resource—AMERICAN WILDLIFE.



AMERICAN BISON



PASSENGER PIGEON



BALD EAGLE

EARLY YEARS

America—The New World.

To the first white settlers, the Eastern Seaboard seemed a forbidding place, offering only hardships, deprivation, and alien dangers. Few were equipped by experience, background, or inclination to act out the necessary role of pioneer in a new and virgin land. They came because of persecution and prejudice at home, or because of a vaguely defined hope of a better life.

For the newcomers, life was hard and Nature was a stern taskmaster. True, the boundless forests provided logs to build shelters and fuel for the hearth—but only for those skilled with tools and strong of limb. Food was scarce, and lucky were the settlers befriended by Indians during times of famine.

GAME ABUNDANCE: One redeeming factor was the teeming wildlife on every hand. The continent was truly blessed with mammals, birds, and fishes!

For the first hundred years of colonization and settlement, this gift of Nature provided the necessary sustenance for the advancing frontier. The very clothes worn by the settlers and woodsmen tell a story—buckskin leggings, breeches, mocassins, jackets, buffalo robes, coonskin caps—the list is long. The forest provided turkey, deer, elk, squirrel, and other wild creatures. The plains abounded with buffalo and antelope. Streams offered fish and beaver. The air itself was astir with the flights of geese, ducks, and passenger pigeons.

Even today, the United States is a bounteous, varied, and young country whose people still remember and cherish their pioneer heritage.

Familiarity with wilderness and its freedoms and opportunities; a close dependence on Nature's riches that seemed to be inexhaustible; a great public domain and the right of all citizens to own land; a Federal Government holding only those rights not reserved by the States; a strong belief in local government and a citizen's prerogatives; the common-law concept of public ownership of fish and game, even on private land—these and other historical conditions and events of American life convinced the early settler that to fish, hunt, and observe wildlife was an inalienable right.

DIVERSE CLIMATE: North America, with its crest in the cold Arctic and its base in the warm subtropical region of the Gulf of Mexico; with its Rocky Mountains in the West and its Allegheny Mountains in the East; with its arid deserts, fertile plains, and its well-watered valleys lying between, has within its boundaries almost every possible variation in temperature, precipitation, soil fertility, and vegetative cover. Altitudes range from thousands of feet above sea level to parts of Death Valley that are below sea level. Temperatures range from frigid cold in the Arctic north of Alaska to steaming heat in the tropics.

This diversity of climate has resulted in a truly amazing variation in both fauna and flora. The tiny lichen of the Arctic requires 50 years to grow only a few inches in contrast to thick jungle-like growth along the Gulf Coast. Both the huge brown bear of Alaska and the tiny pigmy shrew, weighing less than one-fifth of an ounce, exist here under the conditions each requires to live and multiply. So does the great California condor, one of the world's largest birds, with a wing spread of almost 10 feet, and so also does the tiny wren, about as large as one's thumb. It seems that on this continent Mother Nature tried her utmost to supply the best possible accommodations for an infinite variety of creatures.

THE SETTLERS: The early pioneers, explorers, and trappers saw such an abundance of wildlife that they were hard put to describe it. They spoke of flights of passenger pigeons that darkened the sky for hours on end and told of bison herds that covered the prairie as far as the eye could see. The eminent naturalist, James Audubon, stated that a continuous stream of passenger pigeons he saw on one occasion included more than 1,100,000 birds, which would consume more than 8.5 million bushels of grain daily. Another observer calculated one flock at 240 miles long, numbering 2,230,272,000 pigeons, which would require an estimated food supply of 17.4 million bushels of grain a day.

It is certain that native wildlife made a tremendous contribution to the establishment of our New World economy. The abundance of game and fur animals and of fishes aided the pioneers and settlers

in establishing themselves in the new land. Supplies from the Old World had to be brought over a long and hazardous ocean route—a communication line far from being adequate to support even the smallest outpost of civilization against the rigors of the wilderness. Even after land had been cleared and crops were being harvested, the early settlers found themselves still dependent on wild game and fur animals for a considerable part of the essentials of life.

The Indians who occupied the North American continent for millennia made no such inroads on Nature's largess as the white man was to accomplish in a brief time. Although at times he was wasteful of game, the Indian lacked the weapons, tools, determination, and culture of the white settlers to create highly artificial landscapes. As successive waves of the new immigrants swept the continent, much of the eastern forested region and then the continental grasslands disappeared before the axe and the plow.

It was at this time that many of the great fortunes were founded on the fur trade. Small, remote trading posts in only a few years garnered many thousands of pelts and left only scattered remnants of what had been a great and valuable natural resource. The pelts of fur animals and the hides of bison were almost the only commodities that could be sent back over the long trail from the wilderness to the settlements—the flesh of game birds and animals could not be preserved for such a journey.

ENVIRONMENTAL CHANGES: The farming and cattle industries and the need for timber changed the landscape and living environment for many kinds of wildlife. Many species adapted to the landscapes and flourished; others diminished; some became extinct.

The utilization of game by the advancing pioneers probably had little lasting effect on wildlife populations, although a rapid decline in some areas and for some species was due to market trappers and hunters. There is little doubt, however, that drastic modifications of habitat played the most important role in the decline of most species.

Colonies of New York and Massachusetts were the first to demonstrate interest in wildlife preservation by enacting a few regulations to protect wildfowl in 1776. Elsewhere there was little interest in

game laws. In 1848, Massachusetts passed a law governing the netting of passenger pigeons, but not to protect the birds—it was to punish anyone caught frightening the birds out of huge nets set by market hunters! In 1857, Ohio considered a law to protect these birds, but it failed passage because “. . . no ordinary destruction can lessen them nor can they be missed from the myriads that are yearly produced.”

A RECKONING: The buffalo was eliminated in Pennsylvania in 1801. The last elk in New York was killed in 1845, and in Pennsylvania in 1867. The turkey disappeared from a large part of both States at about the same time. Around 1860, the last moose in the Adirondacks was gone. Spring shooting of waterfowl was forbidden in Rhode Island in 1848, but the law was soon repealed. In the 1830's, New York and Virginia made vain attempts to outlaw swivel punt guns and other devices that were designed for mass killing of waterfowl. Incredible as it may seem, the last passenger pigeon on earth died August 29, 1914 at the Cincinnati Zoo—a bird numbered in the billions only two decades earlier.

GAME PRESERVES: After the Civil War there was a general increase in wealth and leisure time, and, as rail travel became more extensive and cheaper, people traveled farther afield in search of sport. By this time the sportsmen had become concerned with the decline of game, so they started buying land for private game preserves and became active in bringing about legislation that would be beneficial to their particular interests.

By the turn of the century there were several million acres of private preserves created—mostly in the East. Although there was some concern that most hunting lands would soon be in private hands, the popular notion was that this would be better than to have hunting disappear altogether. Although private clubs were subject to State laws, they could enforce more rigid rules upon their members. As early as 1888 the best waterfowl hunting along the eastern seacoast was under the control of private clubs, and as early as 1892 the deer population of the Adirondack area had benefited from protection afforded by private preserves.



ALASKAN BROWN BEAR



ROCKY MOUNTAIN BIGHORN SHEEP

The early white settlers and their immediate successors had little understanding of the organic relationships in which wildlife is involved. Their methods of land utilization were extremely destructive to essential water, cover, and vegetation, and as these basic resources were destroyed, the wildlife was depleted. Wildlife programs in recent years, therefore, have been directed towards *restoration*—restoring habitat and other factors that will benefit present and future wildlife populations.

OSPREY



LEGISLATION

Between 1850 and 1885, game legislation began to receive its first real consideration, and by 1880 there was some sort of legal protection for wildlife in all of the States and Territories. In 1864, a closed season on buffalo hunting was enacted in Idaho—the first closed season on an animal once thought to be immortal. In Washington Territory in 1865, and in both Wyoming and Colorado in the early 1870's, laws were passed to prohibit wanton destruction of game.

THE LACEY ACT: From the standpoint of overall wildlife conservation, the Lacey Act of May 25, 1900 was one of the most important measures ever to pass the Congress. It has since become a foundation stone for good wildlife management and continues to be used to enforce wildlife protective laws of the States and the Federal Government.

The bill was aimed to suppress the killing of game as a business—a form of destruction popularly known as market hunting. It made it much more difficult to take plumes and feathers from both game and non-game species. It regulated the introduction into this country of all exotic species of birds and mammals, and it prohibited the introduction of species known to be injurious to American wildlife or to agriculture.

In essence, the bill was meant to improve and enhance the status of wildlife by additional protection and by excluding competition for living space by imported species. Enforcement of the Act was placed with the Department of Agriculture and became part of the duties of the Biological Survey. (The Biological Survey was the forerunner of the Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, U.S. Department of the Interior.)

The Lacey Act, as amended, had teeth for enforcement of its provisions. Legal authority stems from the powerful interstate commerce clause of the Constitution. Among its provisions was a prohibition against the “. . . shipment of game taken illegally in one State and transported across State boundaries contrary to the laws of the State where taken.” This means that illegal shipment or transportation of game or parts of game, or of other protected species, from one

State to another becomes a Federal offense. Its effectiveness is obvious by examination of court records, particularly those pertaining to the illegal shipment of beaver and other furs from one State to another.

Prior to passage of the Lacey Act, the taking of wildlife for commercial purposes had been a national scandal. Forty thousand terns are said to have been killed around Cape Cod, Massachusetts, in 1885. These beautiful little birds had already been practically exterminated on the New Jersey coast. Herons, ibises, egrets, gulls, roseate spoonbills, and other nongame birds of fine plumage were suffering excessive kills all along the Atlantic and Gulf coasts.

Even in California, Oregon, and Washington, plume hunters were plying their trade. The rookeries in Florida suffered great destruction as squads of paid hunters were maintained by dealers and local contractors. The purchasers regularly shipped enormous quantities of bird plumes to New York and other centers of traffic.

Out of this traffic in wildlife came the organization of the Audubon Society in 1886, formed "... for the protection of wild birds and their eggs." The Boone and Crocket Club was formed a year later. The League of American Sportsmen was organized in 1898 with the avowed purpose of urging "... more adequate enforcement of game laws and better protection of insectivorous and song birds." All of these organizations developed into militant groups pledged to the cause of wildlife conservation.

MIGRATORY BIRD ACT: Few pieces of national legislation are spontaneous—they result from much debate and discussion on many levels. This was also true of the Migratory Bird Conservation Act of 1929. The Lacey Act, although it represented a great step forward, had proved to be incapable of halting the decimation of waterfowl. The game markets of Boston, New York, Philadelphia, Washington, Baltimore, Chicago, New Orleans, Salt Lake City, San Francisco, Portland, and Seattle readily accepted game of all sorts as shipments came in from the slaughtering grounds. No section of the country escaped; expert hunters worked six and sometimes seven days a week, from daybreak to dark.

The Federal Refuge Program in the United States was initiated when President Theodore Roosevelt set aside Pelican Island in Florida on March 14, 1903. The refuge system grew slowly from that time, but adequate funds for the administration and maintenance of these areas did not follow the growth of the system. With the passage of the Migratory Bird Act, which authorized appropriations for the establishment, improvement, and maintenance of such refuge areas, the program really got underway. The Migratory Bird Hunting Stamp Act, which became effective on July 1, 1934, supplemented and supported the Migratory Bird Conservation Act by providing funds for the purchase and maintenance of areas for migratory waterfowl refuges.

As mentioned previously, there is no private ownership of wildlife in the United States. This resource belongs to the people. Protection is a public problem and as such is of State and Federal concern. The States have jurisdiction over all wildlife within their borders, with the exception of one group. That group—the migratory birds—is protected by Federal law under treaties with Canada and Mexico, because these birds migrate over vast stretches of land without regard for State or international boundaries. States work very closely with the Federal Government in the protection and management of migratory species. The Federal Government, as in other Government fields, has also been called upon to carry on many wildlife investigations that can be more efficiently done by centralized efforts.

PITTMAN-ROBERTSON PROGRAM: The Federal Aid in Wildlife Restoration Act was passed by Congress in 1937. It is better known as the Pittman-Robertson Program, or simply the "P-R" Program, after its sponsors, Senator Key Pittman of Nevada and Representative A. Willis Robertson of Virginia.

Since it went into effect July 1, 1938, the P-R Program has made nearly 50 million acres available for hunting and other sports activities. It has also transformed game management from hopeful guesswork to applied science, much to the benefit of sportsmen and landowners everywhere.



A Federal excise tax of 11 percent on sporting arms and factory-produced ammunition supplies the funds for the program. Collected at the manufacturer's level, the tax monies are distributed to the States on a 75- to 25-percent matching basis to be used by their game departments for various wildlife projects. Since its inception, more than 438 million dollars has been allotted to the States with shares based on each State's area and number of hunting licenses sold. No State may be allotted more than 5 percent, nor less than 0.5 percent, of each year's P-R outlay. The apportionment to the

fifty states plus Guam, the Virgin Islands, and Puerto Rico added up to 32.8 million dollars in Fiscal Year 1970.

Recently, the President signed into law a Congressional Act amending the P-R program, making available to the States the excise tax on the sale of pistols and revolvers. On the same 75- to 25-percent matching basis, half the funding is to be used for target ranges and firearms safety programs; the other half is to be directed to the Federal Aid to Wildlife Restoration Fund. Previously the 10 percent handgun sales excise tax went onto the general fund of the U.S. Treasury. This tax amounted to \$6,697,000 in Fiscal Year 1970.

To become eligible for P-R funds, a State must not divert hunting license fees for any purpose other than administration of its fish and game department.

Motivated by the Pittman-Robertson Program, State game departments have moved into land acquisition and management on a broad scale and embarked on a wide variety of wildlife research and development projects. Then, they can spend their own money on the projects, secure in the knowledge that they will be reimbursed for up to 75 percent of their outlays. If a State does not use its P-R allotment one year, it may use it the next.

Unobligated P-R monies at the end of the second year revert to the U.S. Fish and Wildlife Service and are utilized under the Migratory Bird Conservation Act. No State's allotment may be transferred to another State.

Some of the Nation's finest public hunting is to be found in tracts purchased outright by the States with P-R funds—nearly 3 million acres over the past 30 years. In fact, all aspects of game management have benefited greatly from the P-R Program since its inception. Thirty years ago it was thought that the best way to conserve game was to shorten the hunting season and to restrict the hunter's quota of game, or to pay bounties for the elimination of predators. It was thought that the best way to improve hunting was to stock every available habitat with the most popular game bird or animal of the region.

When P-R funds first became available, game departments made liberal use of them in research projects to determine why these so-called "conservation" techniques did not yield the hoped-for results. As a reservoir of scientific knowledge about wildlife and conservation has been built up, less P-R money has had to be spent on research projects. Nevertheless, research carried out under the P-R Program continues to improve the quality of game management throughout the country.

No phase of game management has benefited more from the Pittman-Robertson Program than restocking. From indiscriminate and ineffective dumping of birds and animals, restocking has been refined so that the right wildlife in the right quantity is settled on the right land. The list is long and runs the gamut of restocking native species to areas overhunted or destroyed through changing or harmful land management practices. The white-tailed deer has been successfully returned to many of the eastern States. Equal success can be reported for return of the wild turkey to many of its native haunts.

In retrospect, one can say that during the 30-odd years since the enactment of the Pittman-Robertson Program all phases of game management have benefited greatly. The American sportsmen owe a vote of thanks to those responsible for its introduction and safe passage through the Congress.

DINGELL-JOHNSON PROGRAM: A federal aid to sports fisheries program became effective on July 1, 1950, with the signing of the so-called Dingell-Johnson Bill, named after its sponsors. The provisions are similar to those of the P-R Act, and are administered by the same organization in the U.S. Fish and Wildlife Service.

The income from the 10 percent Federal tax on fishing tackle was estimated to amount to 3 million dollars for the first year. Annually, the fund becomes available for appropriation to the States, 40 percent to be based on available fishing water and 60 percent on the number of fishing licenses sold. Since the beginning of this program, nearly 133 million dollars has been collected. The 1970 Fiscal Year tax was 13.9 million dollars.



BEAVER

It might appear that research is a well-established and well-supported function of wildlife management agencies, but this is not quite true. A shortage of funds has been a feature of wildlife conservation and research since its very beginning. Salaries have been consistently low for well-trained administrators and their assistants, and State legislators have been loath to appropriate sufficient funds to underwrite much-needed research programs. Aldo Leopold was impressed with this fallacy in 1937: He said that we ". . . are spending a score of millions on wildlife, but not a red penny for research. They come to some research unit whose total budget would not pay their office boys and say: 'Please give us the facts on which to build our program.' Naturally, we can't. Nor could we if we stood with them under the financial cloudburst. Facts, like pine trees, take not only rain, but time."

WILDLIFE MANAGEMENT: The beginning of modern wildlife management can be traced to formation of the Iowa Game Con-

servation Commission in 1931 by some farsighted and concerned citizens—among them were Jay N. Darling and Aldo Leopold. Upon the recommendations of the Conservation Commission, a new Iowa State law set up the game and fish department under a bipartisan conservation commission and required that game and fish be managed in such manner that any loss suffered by a species would be compensated by natural reproduction. The Conservation Commission was designated as the sole agency to determine whether or not a biological balance existed. Jay Darling and Aldo Leopold, as members of the Commission, pointed out that the first and most immediate problem was to find trained and competent wildlife biologists and game managers. Very few were available in this field, and such schooling as was offered dealt with pest species or with pure science.

The essential ingredients of game management are skillful investigators, money to pay them, land on which to work, and proximity to individuals engaged in related fields. The obvious choice was at a State Agricultural College, and Iowa State College at Ames, Iowa, was the site chosen for the first training to be offered in this new profession. Three years later, in 1934, Jay Darling was appointed Chief of the U.S. Bureau of Biological Survey, Washington, D.C. In his new capacity, Mr. Darling urged expansion of the Iowa experiment to include the Federal Government, thus making it a State-Federal function under which each of nine land-grant colleges furnished money, services, or equipment—to be matched at each school by equal contributions from the American Wildlife Institute, the Bureau of Biological Survey, and the individual State Game Department.

A logical followup to this Federal-State program was a cooperative agreement signed in 1946 between the Federal Extension Service and the U.S. Fish and Wildlife Service, which resulted in more emphasis being placed upon game and nongame species. At the present time, there are 50 extension fish and wildlife specialists in 24 States, who train county extension workers in fish and wildlife, provide leadership in wildlife programs for 4-H and other youth

groups, serve as liaison between various wildlife organizations, and give training and advice for income-producing enterprises that are related to land and wildlife.

WILDLIFE RESEARCH: The attention being directed toward our wildlife resource has increased dramatically in recent years, reflecting a new awareness by the general public of the need for outdoor recreation and protection of the environment. This demand can be met only by making additional knowledge available to landowners and land managers so they may attain optimum wildlife populations in concert with other land uses.

Providing a suitable habitat is the key element in management of wildlife and fish populations. In order to emulate a natural habitat for a species, the land manager must provide the required amount of water, food, and cover for that particular species to live, thrive, and reproduce. Management of such a habitat is a very complex undertaking, for each species has rather specific habitat requirements.

The production of timber, grazing of livestock, and water use often have a great impact on the value of a habitat that is also planned for the reproduction and welfare of wildlife. In order to reconcile any possible conflict, the wildlife habitat research specialist seeks to define the particular requirements of the species of wildlife, develop the technology necessary to meet those requirements, and evaluate the impact of other land uses on the environment.

Wildlife habitat research by the Forest Service is a continuing, long-term program of both applied and basic research. At fifteen locations throughout the United States, studies are conducted in cooperation with various State and Federal agencies and, in some instances, with industry and private sportsmen's associations. Wildlife biologists usually work together within a team—referred to as a Research Work Unit. At times, the Research Work Unit is composed entirely of wildlife biologists, but quite often a team of scientists specializing in various disciplines is needed to solve the complex problems encountered in the management of lands for multiple uses—including wildlife.



Conservation of natural resources . . .
is the key to the safety and prosperity of the American people,
and of all the people of the world, for all time to come.
—Gifford Pinchot (1865-1946)

RECREATION USE

HUNTING: Many critics of hunting are concerned with the motivation of the hunter and the conduct of the hunt. In a recent study of this subject, nearly half of the hunters said that they could be satisfied with the hunt even if they did not kill any game, and about four-fifths said that much of the pleasure of hunting is the result of experiencing the wonders of nature at first hand.

It is undoubtedly true that the large majority of sportsmen strive for a clean and merciful kill achieved through strict adherence to regulations. To be intentionally cruel and to wantonly inflict pain is as reprehensible to the true sportsman as it was to that gentle healer and philosopher Albert Schweitzer.

Comprising less than one-twelfth of the Nation's total area, the National Forests and National Grasslands account for about a third of the total harvest of big game. Inasmuch as 85 percent of these lands are in the Western States, they produce a much higher percentage of the wilderness type game animals such as moose, elk, bighorn sheep, and mountain goat. In 1970, there were over 14 million hunter visitor-days of use on Forest Service administered lands. (*Note:* Each hunter/fisherman visitor-day represents the equivalent of one person hunting/fishing for 12 hours or 12 persons hunting/fishing for one hour.)

FISHING: It is also noteworthy that the National Forests and National Grasslands have nearly one-fourth of the cold-water fishing streams in the United States, excluding Alaska, and more than half of the cold-water lakes and reservoirs, excluding the Great Lakes. (These waters are so designated because they produce cold-water species of game fish.) More than 10,000 miles of National Forest streams in the Pacific Northwest are used by spawning salmon and other anadromous game fish. These waters are particularly important because they are part of the nursery streams so necessary for perpetuating the runs of these choice food and sport fishes. Sport fishing for salmon in off-shore waters is big business.

All fishing waters can remain productive only so long as good water quality is maintained. Salmonid species of fish are among the

COUGA



COURTESY DR. MAURICE G. HORNOCKER

LESSER PRAIRIE CHICKEN



MOOSE

WILD TURKEY



DALL SHEEP



TRUMPETER SWAN



least tolerant to water pollution. As man's activities increase, the job of maintaining water quality becomes more difficult.

In 1970, there were nearly 15 million water fisherman visitor-days of use on Forest Service administered lands.

NONCONSUMPTIVE USE: Fish and wildlife on the public lands, both game and nongame species, constitute an important national resource. Although about 40 million hunting and fishing licenses, applying to public and private lands alike, were sold in the United States in 1970, the fish and wildlife on the public lands have much greater significance and meaning beyond hunting and fishing.

Millions of people enjoy photographing wildlife, or observing and studying birds and animals, as a part of their camping, hiking, picnicking or other forms of outdoor experience.

The Forest Service recognizes the importance of these non-consumptive values now and for the future.

Public sentiment is everything.
With public sentiment, nothing can fail;
Without it, nothing can succeed.
—Abraham Lincoln (1809-1865)

MANAGEMENT

Scientific management of wildlife and its habitat often becomes very complex. Through the issuance of specific regulations, the Secretary of Agriculture, many years ago, recognized the responsibilities of the respective States for protection and management of wildlife on the National Forests. Wildlife habitat on these forests, on the other hand, remains a responsibility of the Forest Service. To define this delineation of responsibility better and to provide a close working relationship between both agencies, memoranda of understanding have been approved in each State containing National Forest lands. These agreements have worked very well as a basis for performing the National Forest wildlife management job on a partnership basis. And, under these agreements, much of the habitat improvement work is cooperatively planned and financed.

Another complexity of management is the need for public support. States can manage and control game populations only to the extent that the public will support such management. Thus, there is need for conservation education to apprise the public continually of the reasons for various aspects of management. Too often, human emotions influence management decisions.

COORDINATION OF USES: In the management and use of other National Forest resources, wildlife habitat can be enhanced or degraded. If degradation occurs, a study is made of events leading to the error in management, and attempts are made to avoid a recurrence. On the other hand, with proper technical planning, other forest activities can often be carried out in such a way that wildlife habitat is improved.

Trained wildlife biologists are assigned to the Forest Service organization to help achieve proper management and development of wildlife habitat. The biologist knows that a dense unbroken stand of timber is unproductive for many forms of wildlife. Nutritious forage is not produced under dense shade, but rather in openings where sunlight can penetrate to the ground. This leads to the generally accepted conclusion that productive wildlife habitats should have interspersed openings and a variety of food plants.

FORESTRY PRACTICES: A properly planned timber harvest can be an effective and economical way to develop a productive range for certain wildlife species. The Douglas fir timber zone in western Oregon is an excellent illustration. Extensive logging developed there in the late 1940's. Blacktailed deer, which inhabit the Douglas fir forests, showed no increase in numbers from 1940 to 1950, but showed a *fourfold increase* between 1950 and 1960, and another 20 percent since 1960. It seems obvious that dispersed patch-cutting of timber, through its effect on forage production, has been the greatest single factor to cause the spectacular increase in the numbers of blacktailed deer during the past 20 years. On the other hand, mule deer in eastern Oregon showed a slight increase from 1940 to 1950, more than a twofold increase from 1950 to 1960, and another slight increase since 1960. The more gradual increase of mule deer has been attributed to an adjustment in livestock use as well as the timber cutting program. The elk population in Oregon has more than doubled since 1940—following a pattern similar to that of the mule deer.

Under the present rate of timber sale activity on National Forest land, timber cutting (including the thinning of young stands) is dispersed over about 1,750,000 acres annually, of which about one-fourth is in some form of small clearcuts. The degree of benefit to wildlife from these cuttings is indicated to some extent by the high sustained levels of harvested deer and other game.

DIRECT HABITAT IMPROVEMENT: Direct habitat improvement work has also paid off. Controlled burning to stimulate sprout growth, planting and seeding of browse, and the release of preferred food plants are examples. A type of improvement that has proved to be very important over the years is the construction of new watering facilities. These include waterholes, spring developments, and "guzzlers." Guzzlers, which catch rainwater and funnel it into a tank, are used extensively in the more arid parts of the West. They are regularly used by quail, deer, and many other wildlife species. In the East, on the other hand, large numbers of waterholes have been constructed to enhance turkey ranges. Where natural surface

water is scarce, a waterhole for each square mile of land often is desirable for nonmigratory game.

On some of the better ruffed grouse areas, abandoned logging roads have been converted into hunter walkways. Upon the closing of timber sales, some of the temporary roads are seeded to a grass and clover mixture and, where necessary, closed to vehicular traffic. The seeding retards invasion of timber, and the walkway provides a feeding area for grouse.

WETLANDS: National Forests along the Mississippi flyway are particularly well situated for waterfowl use. A short time ago, some 2,000 acres of the Oakwood Bottoms Greentree Reservoir was completed on the Shawnee National Forest in Illinois. Through a system of low dikes, control gates, and pumped water supply, the area is flooded during the late fall and winter season to help hold and feed migrating and wintering populations of waterfowl. The local wood duck population is expected to increase significantly on the project area, which supports growing stands of pin oak trees. In a locality where the better private lands are posted against hunting and trespass, this developed area is especially welcomed by both the hunting and nonhunting public.

Wetland development on the Chippewa National Forest in Minnesota also presents great promise. Of the total Federal acreage in this Forest, about one-half is open water in lakes of more than 10 acres. Here, duck nesting is limited to portions of the shoreline. Another quarter of the Forest area is classed as wetland. One-third of the wetlands, about 50,000 acres, can be effectively developed and managed for waterfowl production. Development includes construction of shallow-water impoundments, creation of potholes, and installation of nesting boxes and platforms. More than a threefold increase in waterfowl production is expected to result from these improvements, as well as benefits to other resources.

Although major efforts in fish-habitat management within National Forests are directed toward maintaining water quality in all forest activities, many improvement projects are resulting in improved habitat conditions for fish. A partial listing of such activities include



GRIZZLY BEAR COURTESY DR. MAURICE G. HORNOCKER



streambank protection, in-stream improvement devices, fishways, debris removal, and the construction of fishing lakes.

SPORTSMEN'S CONTRIBUTIONS: It is not generally known that hunters and fishermen pay for the support of all 50 State fish and game agencies through sales of hunting and fishing licenses. The money for support of these agencies does not come from general revenue channels, as most people believe. In fact, hunting and fishing are unique among most outdoor recreational activities in that the participants directly pay for the support and increase of their sport. It should also be pointed out that without this direct support, most game management programs would be in serious condition.

Refuges purchased by sportsmen's money support more species of non-hunted wildlife than game species. In most cases, game refuges are open to the general public. The picnicker, the hiker, and the photographer are seldom aware that quite often the land they enjoy has been bought by sportsmen's money. The nature lover seldom understands that the preservation and increase of wildlife is made possible largely through funds that have been supplied by the sportsmen of America.

Sportsmen spend millions of dollars developing and improving private lands for wildlife habitat—a conservative estimate is over 100 million dollars a year. Thousands of sportsmen devote countless hours planning and working on habitat development. As 60 percent of the land in America is privately owned, it is obvious that the future of wildlife depends to a great extent on such private development.

The public, and too often the hunter, does not understand the careful surveys that are made by State and Federal agencies before hunting seasons and bag limits are set. Many species of game, such as white-tailed deer and mourning dove, are more abundant than when the first settler came to this country. It is worthy of note that when a game species is in short supply, the hunter is not only the first to call for action, but he supplies the money to employ biologists and make sure this species is protected and increased.

For the most part, the species of wildlife that are endangered in America are not game species. For example, the population of blue-birds, which has never been hunted, has declined drastically during the last decade.



BOBWHITE QUAIL



AMERICAN EGRET



MALLARD DUCKS



ROCK PTARMIGAN



LIMPKIN



WILD BOAR

Habitat is then the starting point for any and all successful game increase. If we are to increase a game species, we must first know the habitat requirement of the species, then find or create and preserve that environment type.
—Wallace Grange (1905—)



MULE DEER

ELK



WHITE-TAILED DEER



BLACK BEAR



BIG GAME

A large segment of the big-game population of the United States lives all or part of the time on the National Forests and National Grasslands. Mule deer of the western forests are the most abundant, followed by white-tailed deer (with the largest numbers in the East and South), blacktailed deer (found only in the Pacific Coast regions), elk (mostly in western areas), turkeys, and black bear. The National Forests also contain extremely important habitats for antelope, bighorn sheep, moose, mountain goats, javelina, brown and grizzly bears, mountain lions, and the introduced wild boar. A few caribou in National Forests in Idaho, Washington, and Alaska complete the big-game picture. Several of these species, such as the deer and elk, are in large numbers and provide the bulk of big-game opportunity, while other species, such as the grizzly bear, mountain goat, and bighorn sheep, are few in number but provide trophy and other unusual hunting, viewing, and photographic experiences.

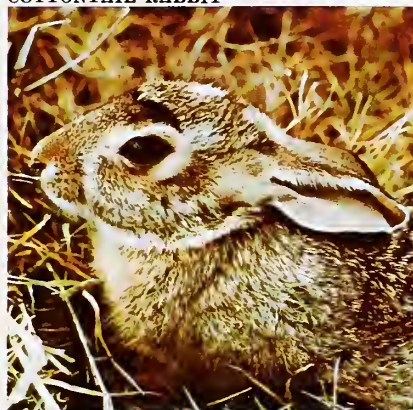
Big-game species are valuable not only for hunting, but for the enjoyment they provide to those who do not hunt. The opportunity of observing deer, elk, bear, and other big-game species is the high point of the trip for many thousands of people visiting the National Forests.

On most National Forests, there is adequate food, water, and cover to support the year-long requirements of the forest herds of big-game animals. However, there are exceptions. There are National Forests in the West where the winter range for deer and elk, and in some instances the summer range, is inadequate to carry the present level of big-game populations. The same situation exists in the deer-yard areas of the North Central and New England States. Where this situation occurs, it can generally be corrected through a reduction in animal populations through hunting combined with a habitat improvement program for the ranges of the involved species.

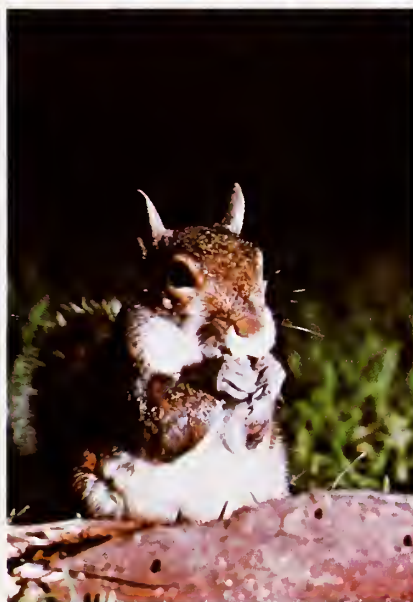
The importance of habitat for big-game species can scarcely be overstated. If habitat is not adequate in both quantity and quality, only small populations can be sustained. However, a well-managed forest in which wildlife numbers are balanced with the habitat capability can generally support large numbers of animals indefinitely.



COTTONTAIL RABBIT



RACCOON



GRAY SQUIRREL

SMALL GAME

Small-game species abound on all our National Forests and Grasslands. The wild turkey, while sometimes listed as big game under State regulations, is becoming common from coast to coast and border to border. Various sub-species originally were native to a particular section of the country, but transplanting and cross-breeding of native and domestic stock has somewhat dimmed the identification of original breeds.

The cottontail rabbit is the most popular small game animal in the Nation. Each fall, the forests and meadows echo to the excited yelps and baying of beagles and other hounds as they chase their elusive quarry. In northern States, the snowshoe, or varying hare, blends his white fur into the snowy landscape and demands a discerning eye of the sportsman.

Blue grouse, sage grouse, and chukar partridge are Western game. Bobwhite quail, woodcock, squirrel, raccoon, and 'possum have their devotees in the East and South. The mink and weasel are trapped for their fur, as well as the beaver, which is taken in limited quantities both in the East and the West.

The list is long, too numerous to detail. But they are all at home on our National Forests and National Grasslands.

CANADA GOOSE



NON-GAME SPECIES

These include those species not hunted for sport or for their valuable fur or edible meat.

Songbirds form the most numerous group, varying in quality of song and brightness of plumage. What would our forests be without our feathered friends—the scolding of the jay, the inquisitive chickadee, and the mournful cry of the loon?

The waddling porcupine, the mouse, vole, turtle, frog, and toad—these are but a few non-game species. The crow and his larger western cousin, the raven; the hawk and kingfisher; the sparrow, robin, and tiny wren; the staccato notes of the woodpecker pounding on a hollow limb, easily discernible above the howling wind and creaking trunks of trees—these form the actors and the background symphony of a forest.

Non-game species form an integral part of a forest and contribute substantially to the enjoyment of the forest visitor. They also play an important role in the ecology of the forest. Therefore, the preservation of habitats of non-game species is extremely important in the overall management of the National Forests and National Grasslands.



GOLDEN EAGLE

LOON



GOLDEN-MANTLED GROUND SQUIRREL



AMERICAN BADGER



COYOTE

COURTESY NATIONAL PARK SERVICE

FISH

Streams, lakes, and reservoirs on National Forests are among the best quality fishing waters in the Nation. Generally located on the watershed above the influences of municipal and industrial pollution and subject to effective types of land management, these waters are less affected by the encroachment of civilization. Protection of the watershed and maintenance of stable stream-flows of high quality are two of the major objectives of the Forest Service.

The Forest Service recognizes the urgency for more intensive management of fishery habitat to help satisfy the increasing demand for sport fishing. Water impoundments, when constructed on the National Forests, are planned to serve recreational needs as well as other purposes.

More than 10,000 miles of streams within the National Forests constitute "nursery" waters for the production of Pacific salmon. It is estimated that more than 40 percent of the salmon taken by commercial and sport fisherman off the Pacific Coast States have their origin in waters within the National Forests. Salmon is a self-renewable resource, but as with any renewable resource, lack of concern by the public could destroy it. Fisheries experts foresee, however, that salmon will continue to be an important source of food, while providing sport for America's fishing enthusiasts, if the salmon are protected against natural and man-caused hazards.

There are 84,000 miles of streams, approximately 1,500,000 acres of natural lakes and more than 1,000,000 acres of reservoirs on the National Forests. These are the waters that provide a quality fishing experience for millions of sportsmen each year.

The trout leads in popularity among most forest fishermen, with the cutthroat and rainbow most sought in the West, and the brook, rainbow, and introduced German brown in the East. The northern pike, walleye, and the muskellunge are avidly fished for in the Lake States and the Northeast; bass, perch, bluegill, crappie and other warm-water species are most common in the Middle Atlantic States and the South.

The tendency of anglers to seek out the larger and more voracious species of fish with highly regarded game or fighting quali-



ties has been evident since the beginning of sport fishing. These species are generally less available in numbers than are other fishes of smaller size. Obviously, the less glamorous types must provide the bulk of the catch in future years.

Major emphasis in the management of this resource is directed toward planning and developing overall forest programs so as to maintain high-quality water supplies, which, in turn, assure a high-quality habitat for fish.

It is so they die on the plains,
The great old buffalo,
The herd-leaders, the beasts with the kingly eyes,
Innocent, curly-browed,
They sink to the earth like mountains, hairy and silent . . .
—Stephen Vincent Benet (1898-1943)

ENDANGERED SPECIES

Saving the habitat of endangered birds, animals, reptiles, amphibians, and fishes is one of the lesser known activities of the Forest Service—although it has been going on for many years.

Endangered species of wildlife occur in all parts of this country, including Hawaii and Puerto Rico. Endangered species are in immediate danger of extinction.

Saving endangered species nationwide is a truly cooperative job, involving many Federal and State agencies, conservation groups, and individuals. Coordinating the whole program, which was authorized by Congress in 1966, is the Fish and Wildlife Service, U.S. Department of the Interior. Prominent in pressing for action has been the National Audubon Society—acutely mindful of the irreplaceable wildlife already lost, mostly birds of Hawaii. On the extinct list are three parakeets—the Carolina, Louisiana, and Mauge's (of Puerto Rico)—the heath hen of our Atlantic coast, and the famous passenger pigeon.

Of the many species of wildlife on the endangered list, 39 are on or near National Forests. The Forest Service has either drawn up management plans for, or is giving special management emphasis to, many of these endangered species. A recent action taken by the Forest Service in its endangered species program is a joint study and habitat-management project with the Fish and Wildlife Service aimed at preserving the colorful Puerto Rican parrot. Perhaps only 15 or 20 of this large emerald green species, with its red forehead and blue primary wing feathers, survive today—all in the tropical Caribbean National Forest in eastern Puerto Rico.

Although the Puerto Rican parrot now lives in a kind of refuge, as does the California condor, such "total protection" is not considered to be the only method today of safeguarding an endangered species—or any wildlife population. Wildlife is basically dependent upon the condition of its habitat (the area where it lives) regardless of what legal designation is given to the area.

Suitable conditions (food, cover, water supply) for most wildlife species to live and increase to desired numbers can be provided through balanced land-use programs. In most cases, this means forests and other lands can be managed for commercial production of timber, pulpwood, and other crops, and can provide recreation for the public—all these activities without endangering native wildlife. This multiple-use principle is a cornerstone of National Forest management.

The California condor, much larger than the American bald eagle, is a relic of the distant geologic past. Only about 50 of these gigantic scavenger birds survive today, all in the vicinity of

Los Padres National Forest, not far from the densely populated Los Angeles area. Realizing the condor's rarity and value, the Forest Service set aside a refuge in its nesting area in 1937, and another in 1947, to protect the condor's young and help increase its numbers. Condors are also protected by California law.

The tiny Kirtland's warbler in the Michigan lower peninsula has also benefited from special Forest Service help, in cooperation with State and local Audubon Societies. This assistance, startlingly enough, includes setting fires as well as pulpwood harvesting and special plantings.

One of the primary nesting grounds of this lemon-breasted songbird, 4,010 acres in the Huron National Forest, was set aside several years ago as a special management area to insure perpetuation of the species. Portions of the forest are set afire at 5 year intervals, under careful control, while the birds are still in their winter quarters in the Bahama Islands. The intense heat of the fires is needed to open the seed cones of the jack pine, thus starting new seedlings and providing the dense brush which the bird requires. It nests on the ground only where jack pines spread their dense lower branches into thick ground cover. This management program insures that stands of jack pine, 6 to 18 feet tall and between 8 and 20 years old, will always be available. The Michigan Department of Conservation has also set aside three management areas for the Kirtland's warbler.

Many other threatened species of wildlife also find havens in National Forests and National Grasslands. Our national symbol, the bald eagle, is retreating from Virginia, Maryland, and New Jersey because of man's encroachment and activities. The southern subspecies of the bald eagle, also, is on the endangered list and is becoming more scarce each year. The Forest Service has a management program for both these birds, including a regular inventory of nests, improvement and protection of nesting areas; cooperative information programs are sponsored with national, State, and local Audubon Societies in order to build public support for the programs.

The red wolf of Louisiana and nearby States is in immediate danger of extinction. The timber wolf of the Lake Superior region is also endangered in the United States, but it is fairly abundant in Canada and Alaska. Timber wolves are found in the Chippewa and Superior National Forests in northern Minnesota. The range of both wolves has been drastically reduced—both have been ruthlessly hunted, poisoned, and trapped, with bounties as an added incentive.



EASTERN TIMBER WOLF

COURTESY DR. L. DAVID MECH

AMERICAN ALLIGATOR



RED WOLF



CALIFORNIA CO

BROWN PELICAN



PUERTO RICAN PARROT





EASTERN TIMBER WOLF

COURTESY DR. L. DAVID MECH



AMERICAN ALLIGATOR



RED WOLF



BROWN PELICAN



PUERTO RICAN PARROT

CALIFORNIA CONDOR



PEREGRINE FALCON



KIRTLAND'S WARBLER



ENDANGERED SPECIES

ENDANGERED WILDLIFE AND FISH SPECIES¹ ON OR ADJACENT TO FOREST SERVICE ADMINISTERED LANDS

SPECIES


1. Indiana Bat
2. Black-footed Ferret
3. San Joaquin Kit Fox
4. Eastern Timber Wolf
5. Northern Rocky Mountain Wolf
6. Red Wolf
7. Florida Panther
8. Eastern Cougar
9. Utah Prairie Dog
10. Florida Manatee
11. Brown Pelican
12. Mexican Duck
13. Aleutian Canada Goose
14. California Condor
15. Southern Bald Eagle
16. American Peregrine Falcon
17. Arctic Peregrine Falcon
18. Masked Bobwhite
19. Whooping Crane
20. Eskimo Curlew

SPECIES

21. Puerto Rican Parrot
22. Ivory-Billed Woodpecker²
23. Southern Red Cockaded Woodpecker
24. Kirtland's Warbler
25. Bachman's Warbler
26. Shortnose Sturgeon
27. Piute Cutthroat Trout
28. Lahontan Cutthroat Trout
29. Greenback Cutthroat Trout
30. Arizona (Apache) Trout
31. Gila Trout
32. Kendall Warm Springs Dace
33. Gila Top Minnow
34. Humpback Chub
35. Woundfin
36. Colorado River Squawfish
37. Unarmored Threespine Stickleback
38. American Alligator
39. Blunt-nosed Leopard Lizard


¹ Status determined by "Red Book" Threatened Wildlife of the United States compiled by Fish and Wildlife Service,
U.S. Department of the Interior

² Species could be extinct at this time



We travel together, passengers on a little
spaceship, dependent on its vulnerable resources
of air and soil; all committed for our safety
to its security and peace; preserved from
annihilation only by the care, the work, and,
I will say, the love we give our fragile craft.

—Adlai Stevenson,
from his final speech as U.S. Ambassador to the United Nations



THE FUTURE

The Nationwide program to preserve at least minimum populations of each existing species of wildlife has come none too soon, with so many birds, mammals, reptiles, amphibians, and fishes close to extinction, and some others already gone. The Forest Service plans to accelerate its efforts to play an important part in assuring that habitat of rare and endangered species on National Forests receive proper management.

Aldo Leopold was keenly perceptive of future problems for American wildlife, when he stated in his book *ROUND RIVER*: "Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things, wild, and free."

The Forest Service of the U.S. Department of Agriculture is proud of its long record of responsible husbandry of the 187 million acres of forest land under its administration and management. Through tradition and dedication, it is pledged to continue to serve the best interests of the American people now and in the future.

☆ U.S. GOVERNMENT PRINTING OFFICE : 1975 O—590-601

Photographs of the following species appear through the courtesy of the Fish and Wildlife Service: black-tailed prairie dog, wild turkey, Dall sheep, trumpeter swan, rock ptarmigan, mourning dove, cottontail rabbit, raccoon, Canada goose, loon, and snow goose.

